METHOD AND ELECTRONIC DATABASE SEARCH ENGINE FOR EXPOSING THE CONTENT OF AN ELECTRONIC DATABASE

The invention relates to a method and an
electronic database search engine for disclosing an
electronic database comprising an electronic memory device
suitable for storing and releasing elements from the

5 database, a display unit, a user interface for selecting
and displaying at least one element from the database on
the display unit, and control means for controlling the
user interface, which user interface allocates icons to
the elements of the database, which icons are suitable for

10 display on the display unit at mutual distances that
depend on the elements' degree of dissimilarity, wherein
the user interface at initial utilization displays at
least some icons on the display unit.

Such a method and device are disclosed in the

15 article "Interactive Layout Mechanisms for Image Database
Retrieval" by John MacCuish et al. dated 29 January 1996,
published in SPIE, vol. 2656, pp. 104-115. This article
discloses an electronic database search engine, which uses
a display unit showing objects from a database by means of

20 icons or images in a two-dimensional plane. The mutual
distance of the icons on the display area is a measure for
the objects' dissimilarity. The electronic database search
engine according to the article makes it possible by
clicking on an image, to have the neighbouring images

25 displayed on the display unit.

The disadvantage of the known device and method
is that the spatial positioning of the elements is
determined beforehand. All elements then have a fixed
mutual positioning and orientation. This asks for

30 compromises with respect to the visual presentation of the
elements and their respective distances in relation to
each other. Another disadvantage is that searching in the
database is a rather slow process, which is partly due to

the long computing time required by the known system, but more specifically to the rigid structures in which the elements are contained. This is especially true when the database requires a search strategy based on criteria that

5   are subjective or that cannot readily, or not at all be objectified.

This is important since nowadays more and more collections and catalogues are indexed electronically. Examples of this are not only libraries and museum

10   collections, but also catalogues of wines, films, music, paint colours, holiday destinations, and other products that are often assessed subjectively. State of the art search systems can help the user to (re)locate an exactly described element. However, it remains difficult for users

15   to find the correct element in a collection of subjective criteria.

The state of the art solves the problem searching on a subjective criterion) by having the user select search terms from lists (menu selection, or indicating

20   linguistic search profiles. This works well if the user searches an already known element, and he or she is familiar with the name or the desired attributes. In many situations, such as when searching new elements based on "taste" or intuition, the effectiveness of these search

25   profiles is inadequate. Often laborious verbal dialogues in specialist jargon have to take place in order to try and obtain examples from the collection on the display. The dialogue requires that the user have knowledge of the definitions for the attributes stored with the elements

30   (for example in the case of music: the genre, price, and performers).

It is the object of the invention to improve this. To this end the electronic database device and method according to the invention are characterized in

35   that with the control means any arbitrary position can be selected on the display unit and in that, depending on the control means, the user interface displays or removes an icon that relates to an element of the database and of

which the degree of dissimilarity, in respect of the
elements whose corresponding icons are displayed elsewhere
on the display unit, corresponds with the distance taken
up by the selected position in relation to the icons
5   displayed elsewhere on the display unit.

In this way it becomes possible to search in a
database on the basis of criteria that are subjective or
that cannot readily, or not at all, be objectified.

According to the invention an interactive manner
10   of searching in the automized databank is provided, in
which the user spatially indicates the relationship
between his searched-for element and the selected examples
from the collection. The dialogue may be graphical with a
two- or three-dimensional display, in which a selection of
15   elements is shown. The mutual distance between the
elements displayed by means of icons demonstrates the
similarity between the elements according to a criterion,
which preferably is selected by the user. The user may
search by asking for further information from selected
20   icons, by removing icons, or by calling up a new element
at positions between the icons. When searching in this
manner, it is not necessary to know the attributed name.
It is, however, possible to extend the method, in order to
also support linguistic interaction.
25   An important advantage of the invention is that
it allows rapid and direct search in a database comprising
very different elements, without the necessity of going to
the desired sub-collection via related characteristics or
attributes of a preceding sub-collection.
30   After the addition or removal of icons, it is
desirable according to the invention, for the user
interface to adjust the mutual positioning of the icons on
the display unit in concurrence with the mutual
dissimilarity of the elements from the database such as to
35   concur with the displayed icons, in order to optimize the
display area usable on the display unit. Visually, such
adjustments may take place both instantaneously and
gradually. It should be noted, that the positioning of the

displayed elements on the display unit is always scaled such that the possibility of reaching elements of greater dissimilarity remains open by calling up such an element at the periphery of the display unit.

5   Under certain search conditions it may be convenient that the user interface provides means for placing a selected icon permanently in the centre of the display unit, while the remaining displayed icons are subsequently grouped around it.

10   In the method and device according to the invention, use may be made of a conventional graphical display unit, where the user, by means of a mouse, pen or by application of a touch screen, is able to "touch" positions on a display. At the beginning of the search,

15   the display shows a small number of examples from the database. The elements shown on the display exhibit simulated, "self-organizing" behaviour: they endeavour to position at mutual distances that correspond to the degree of dissimilarity of the attributes stored per element.

20   When the user "clicks" on a position on the display, the user interface determines the distances between the click position and the positions of the elements already displayed. It then searches in the database for an element that exhibits the same degree of dissimilarity regarding

25   said elements. That element then appears at the clicked-on position on the display. By clicking on the display closely to a particular element, the user searches a new element that closely resembles that particular element. By clicking on a far-removed portion, the user obtains a

30   very dissimilar new element. When a new element has appeared, the user interface ensures that the elements adjust their mutual positions, thereby changing the visual configuration. The user can also remove elements by "dragging" them off the display. This creates more space

35   on the display so that it is possible, as it were, to zoom in. It is also possible to call up further information for each displayed element, for example, by clicking on twice or by dragging it to a specific position on the

display. This dialogue allows the user to navigate
through the database in order to arrive at those elements,
which best answer his search.

5   The invention optimally takes into account the
capacity that users have of intuitively assessing the
vague relationships between elements from the database,
instead of using the less developed capacity of comparison
to compare abstractly described ideas relating to said
elements.

10   It may be desirable to add to the elements of the
database characteristics that are involved when
determining the elements' degree of dissimilarity, and to
make the assessment of the dissimilarities between the
various characteristics of the elements adjustable. This
15 would provide the user with a simple manner to adjust the
search to his requirements.

       The electronic database search engine according
to the invention can be applied in various ways. It would
be conceivable to apply the device as taste searcher for
20 consumers trying to make a selection from wines, holiday
destinations, recipes, herbs, paint colours, music, films,
and the like, so that the device with such a goal may find
application in shops. The device according to the
invention may also be used as remotely positioned
25 databank, presented on the information supply market by
publishers or other service providers.

       The invention will now be elucidated with
reference to a drawing, which in the Figs. 1 to 5 shows a
non-limitative example of the application of the
30 electronic database search engine according to the
invention.

       The Figs. 1 to 5 schematically show a display
such as will be observed by the user of a database search
engine. The display unit 1 co-operates with an electronic
35 memory device, suitable for storing and releasing elements
from the database. To this end the display unit 1 is
coupled to a user interface serving as intermediary
between the display unit and the database, and serving for

the selection and display of elements from the database on the display unit 1.

To this end the user interface allocates icons to elements from the database such as shown, for example, in
5   Fig. 1, in the form of a chair 2, a vacuum cleaner 3, and a coffee maker 4. In the case illustrated, the database is formed by elements that are found in a domestic situation. Starting with the elements as shown in Fig. 1, a user can now touch any arbitrary location 5 on the display unit as
10   shown in Fig 2. At this location 5, an element from the database will then be shown by means of an icon relating to said element, whose degree of dissimilarity in relation to the elements 2, 3 and 4 already displayed on the display unit 1, corresponds with the distance assumed by
15   the various elements and the touched area 5 on the display unit.

Fig. 3 shows a similar action, where in the left top corner of the display unit 1 an arbitrary area 6 is touched.
20   Fig. 4 shows that the icon 3, relating to the vacuum cleaner, is removed from the display after which, as is clearly shown in Fig. 4, the elements 2, 4, 5 and 6 remaining on the display unit 1, regroup with respect to their mutual positioning.
25   Fig. 5 indicates that the criterion, by which the degree of dissimilarity of the displayed elements is assessed, can be influenced. For example, in the case shown this involves a style aspect. By allowing this style aspect, which is controllable with a slide control
30   7, to carry more weight, style-related elements can be clustered on the display unit 1. This relates to the vacuum cleaner 3, the coffee maker 4, the chair 5, and the vacuum cleaner 8, shown in Fig. 5. The chairs 2 and 6 show obvious style differences, and are displayed at a
35   greater distance from chain 5.